

REPORT DOCUMENTATION PAGE

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Investigating of the Crack Growth Behavior in a Particulate Composite Material under Multi-Axial Loading Conditions

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C.T. Liu

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10 E. Saturn Blvd.

Edwards AFB, CA 93524

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5 Pollux Drive

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Sheila Benner

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(661) 275-5963

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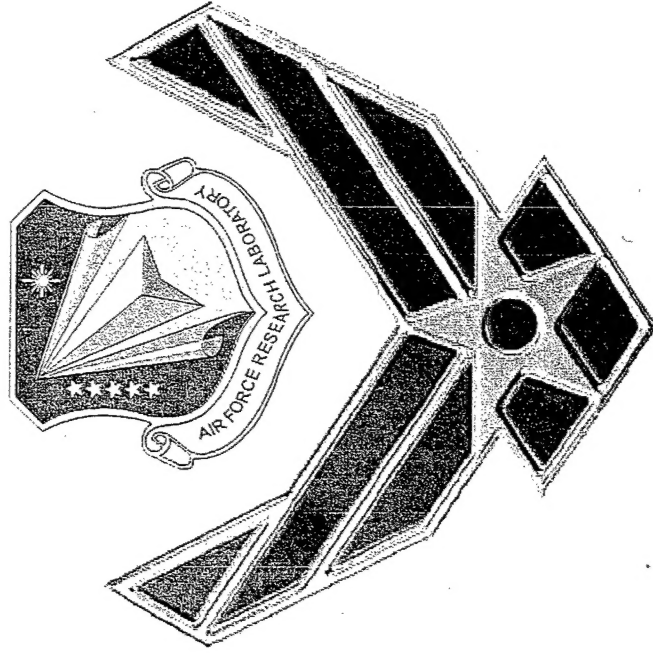
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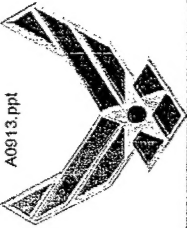
International Conference on Mechanical Behavior of Materials
(Geneva, Switzerland, 25-29 May 2003) (Deadline: 14 May 2003)

(Statement A)

Investigating the Crack Growth Behavior in a Particulate Composite Material under Multi-Axial Loading Conditions.



C. T. Liu
U.S. Air Force Research Laboratory
Edwards AFB CA

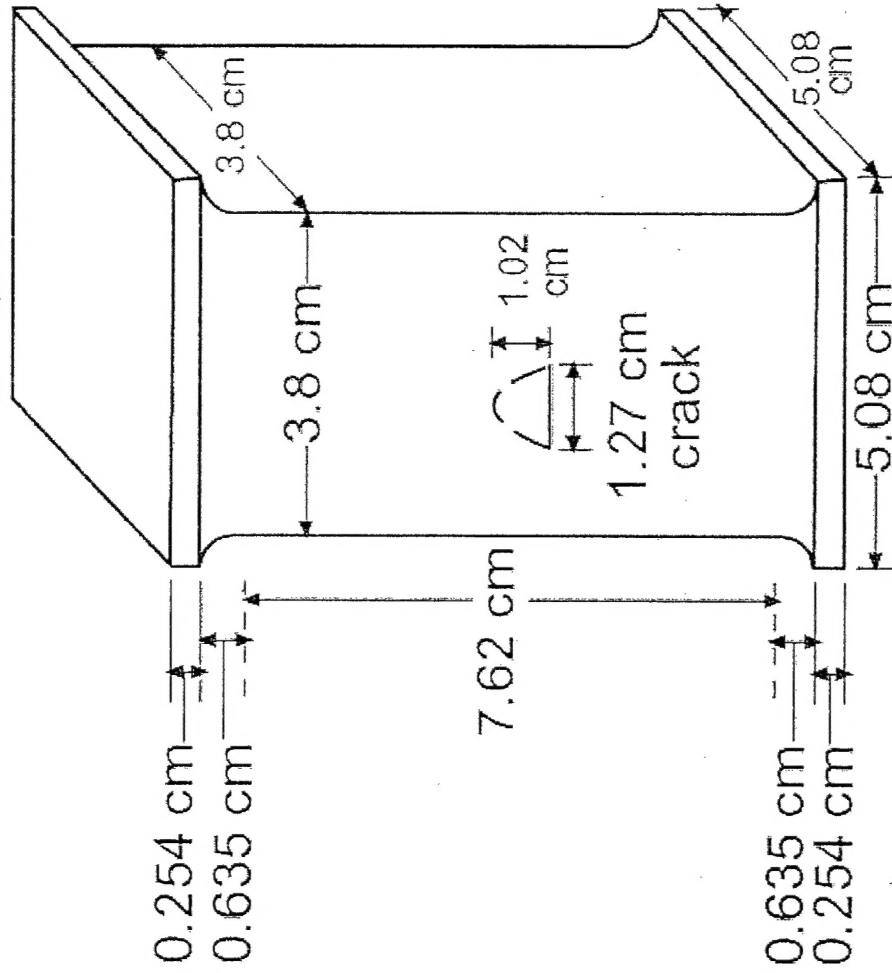
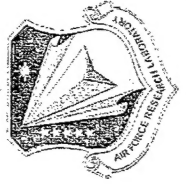


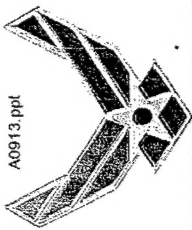
Objectives



- Investigate the Effect of Loading Conditions on the Crack Growth Behavior in a Particulate Composite Material under Confining Pressure
- Loading Conditions:
 - Constant Strain Rate: 5.8 cm/cm/min
 - Constant Strain: 12%, 15%, and 18%.
 - Confining Pressures: Ambient and 6897 Kpa

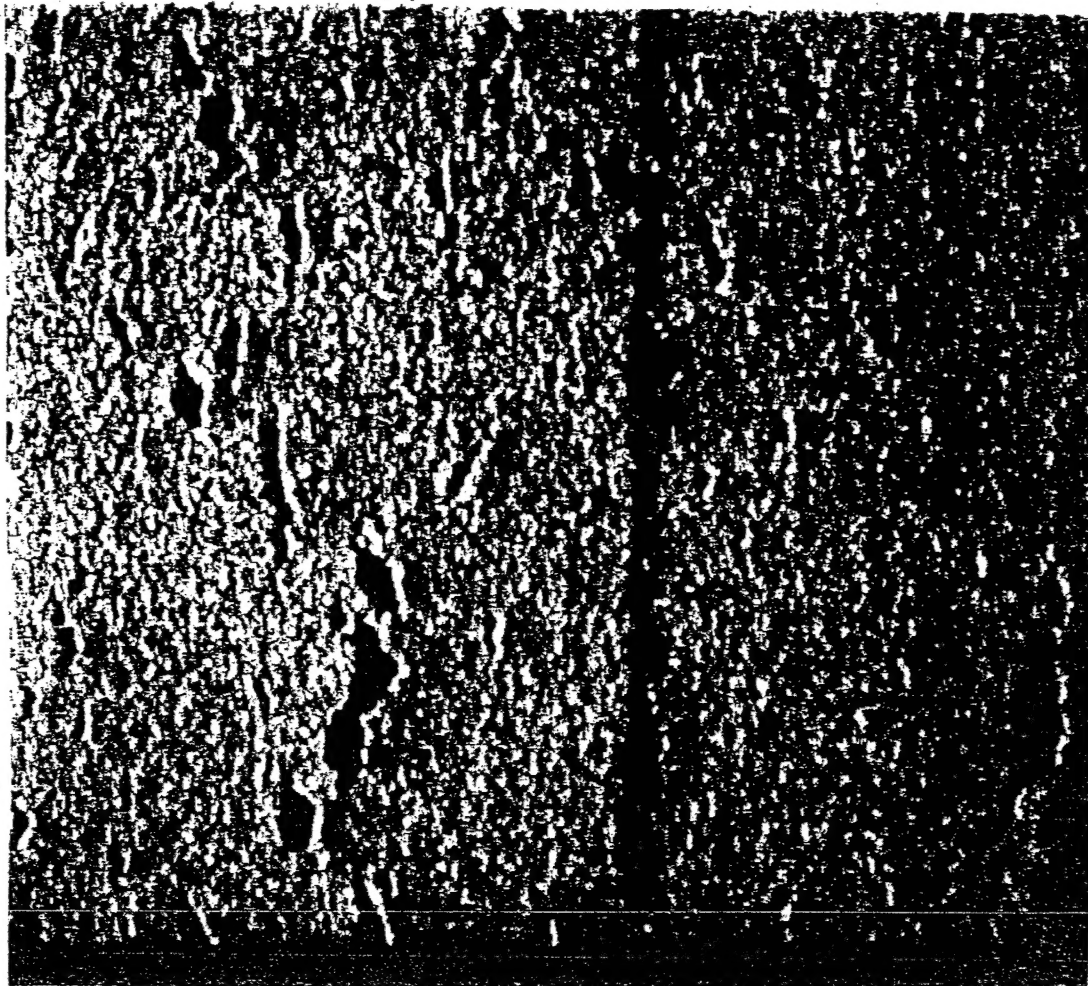
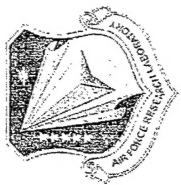
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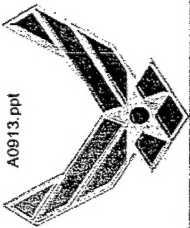




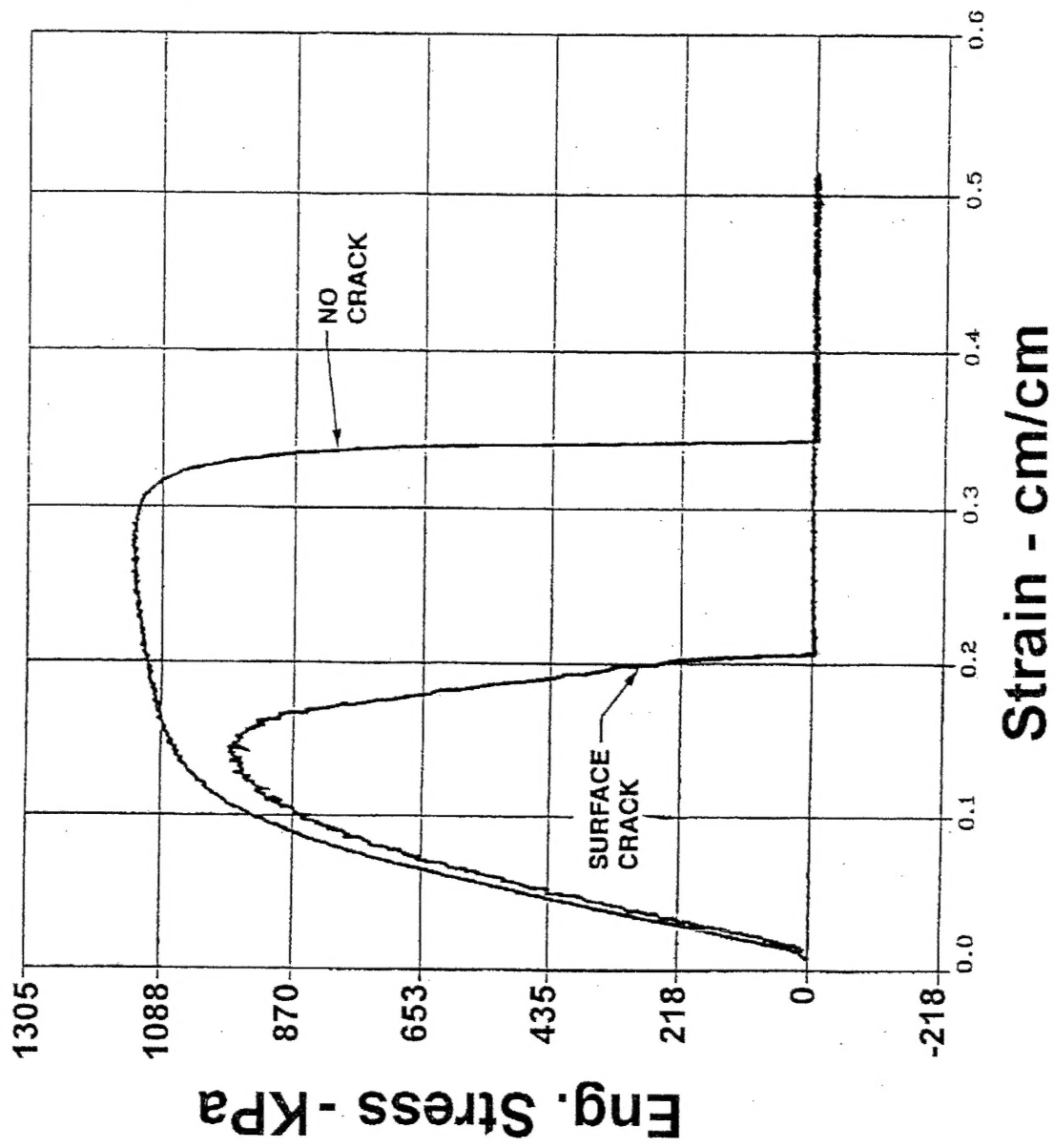
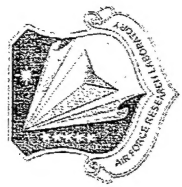
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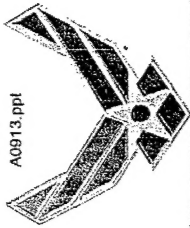
Microcracks in the Specimen under Pressure





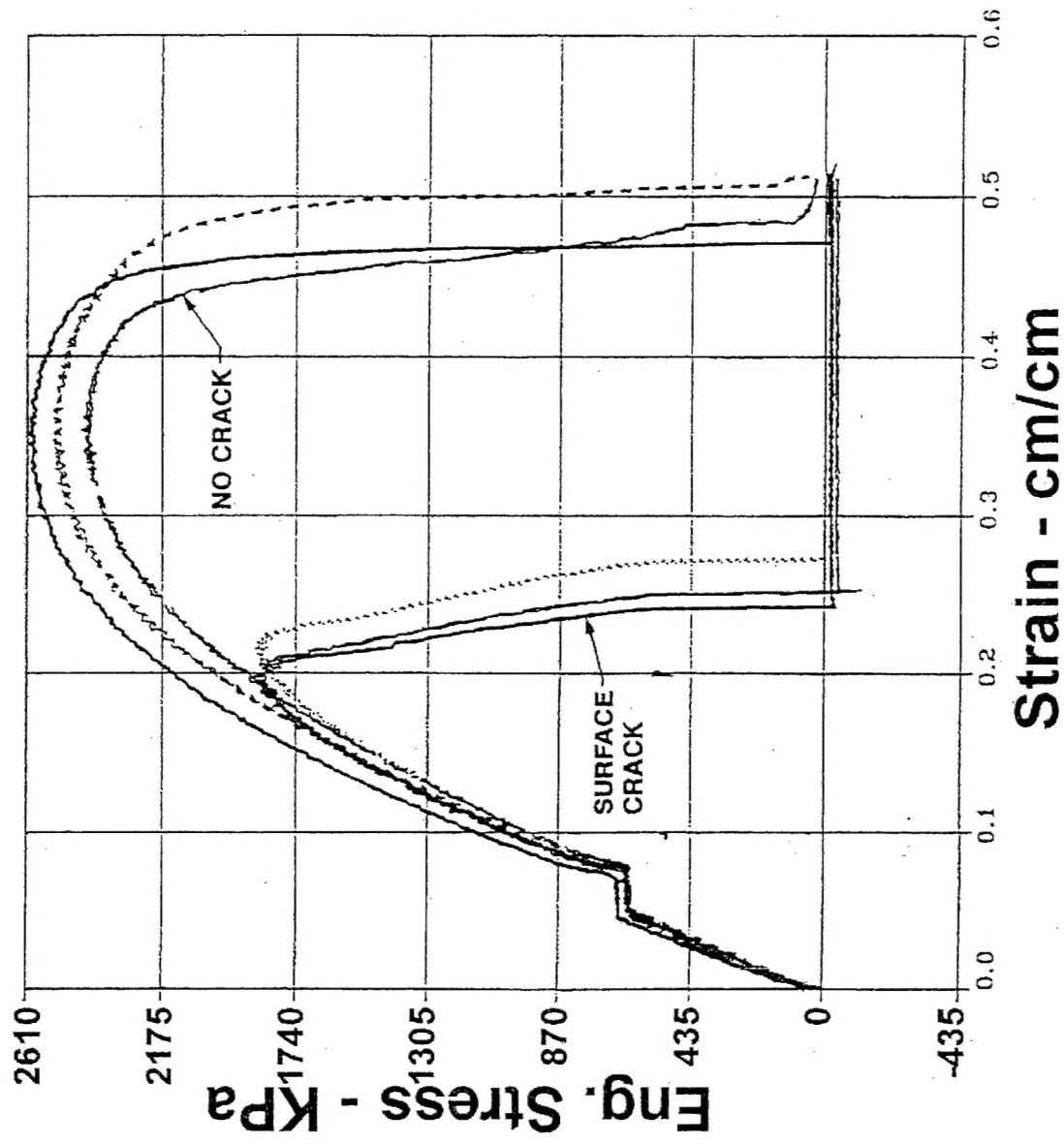
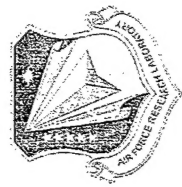
Engineering Stress Vs. Strain (Ambient Pressure)

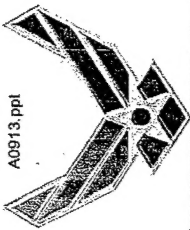




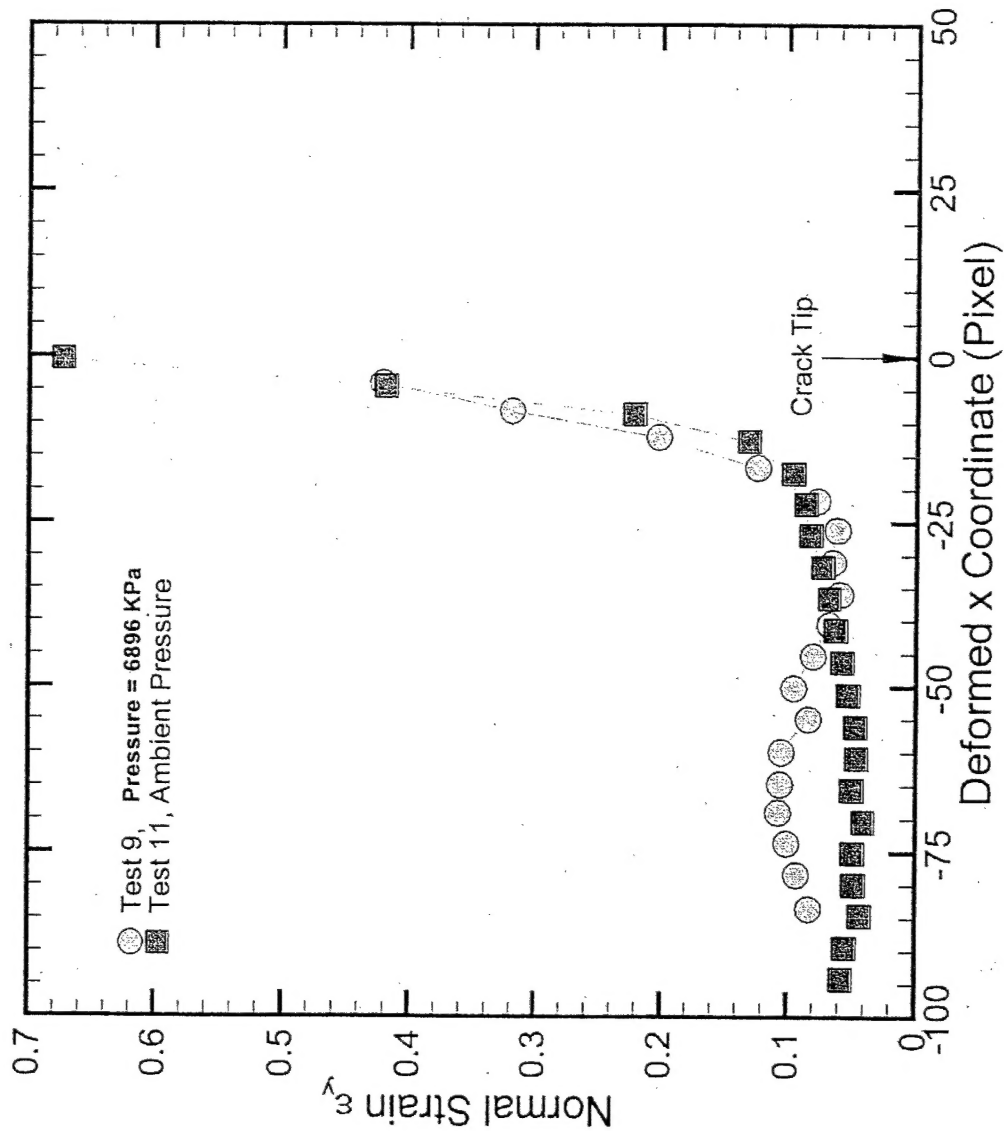
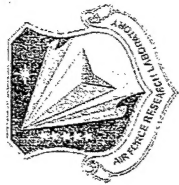
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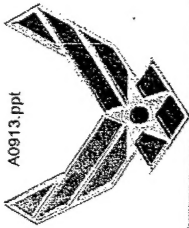
Engineering Stress Vs. Strain (6897 Kpa Pressure)



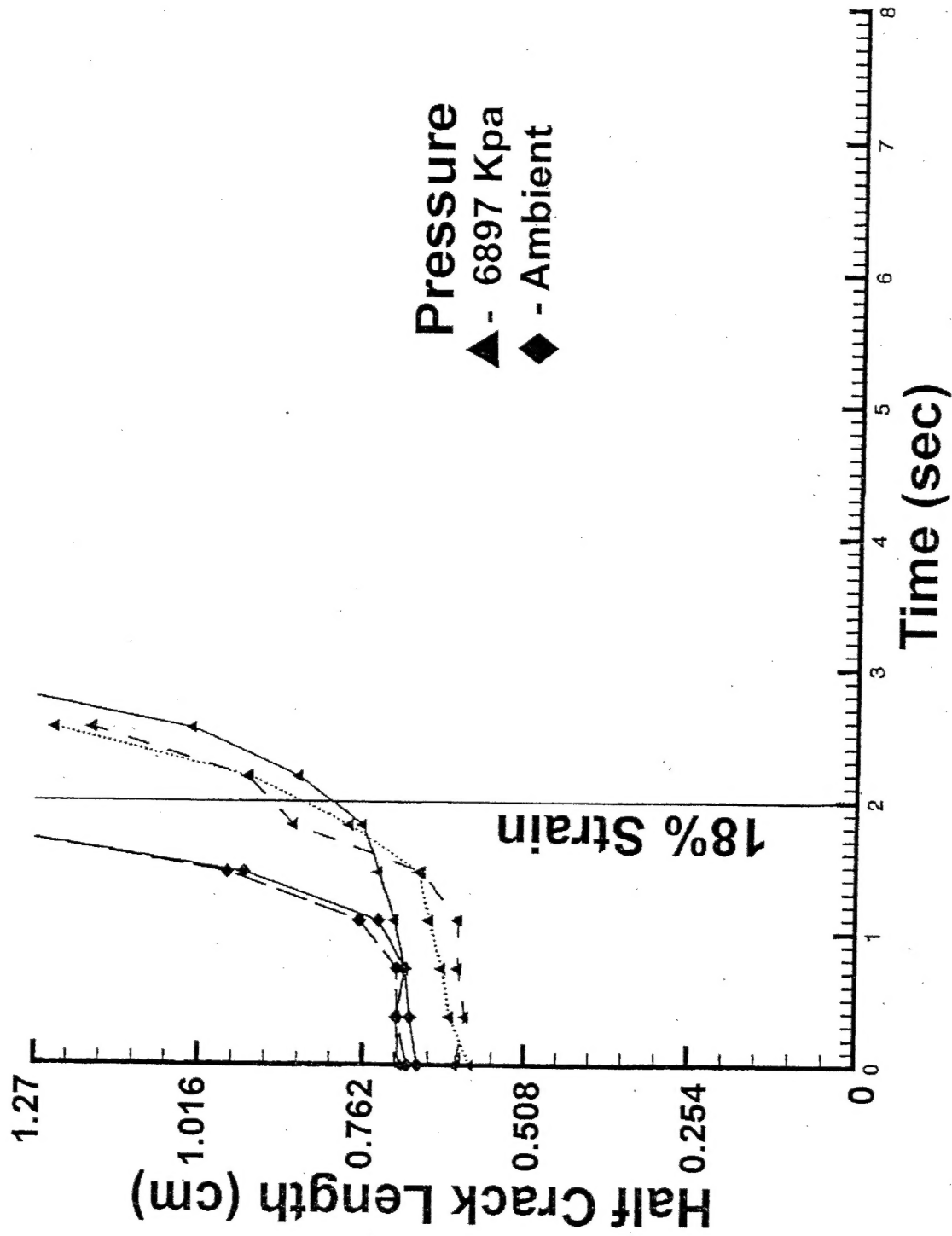
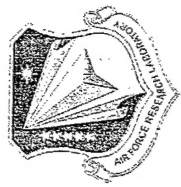


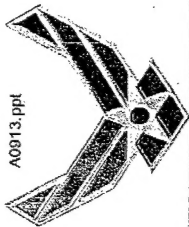
Normal Strain Distribution Ahead of the Crack Tip at the Onset of Crack Growth





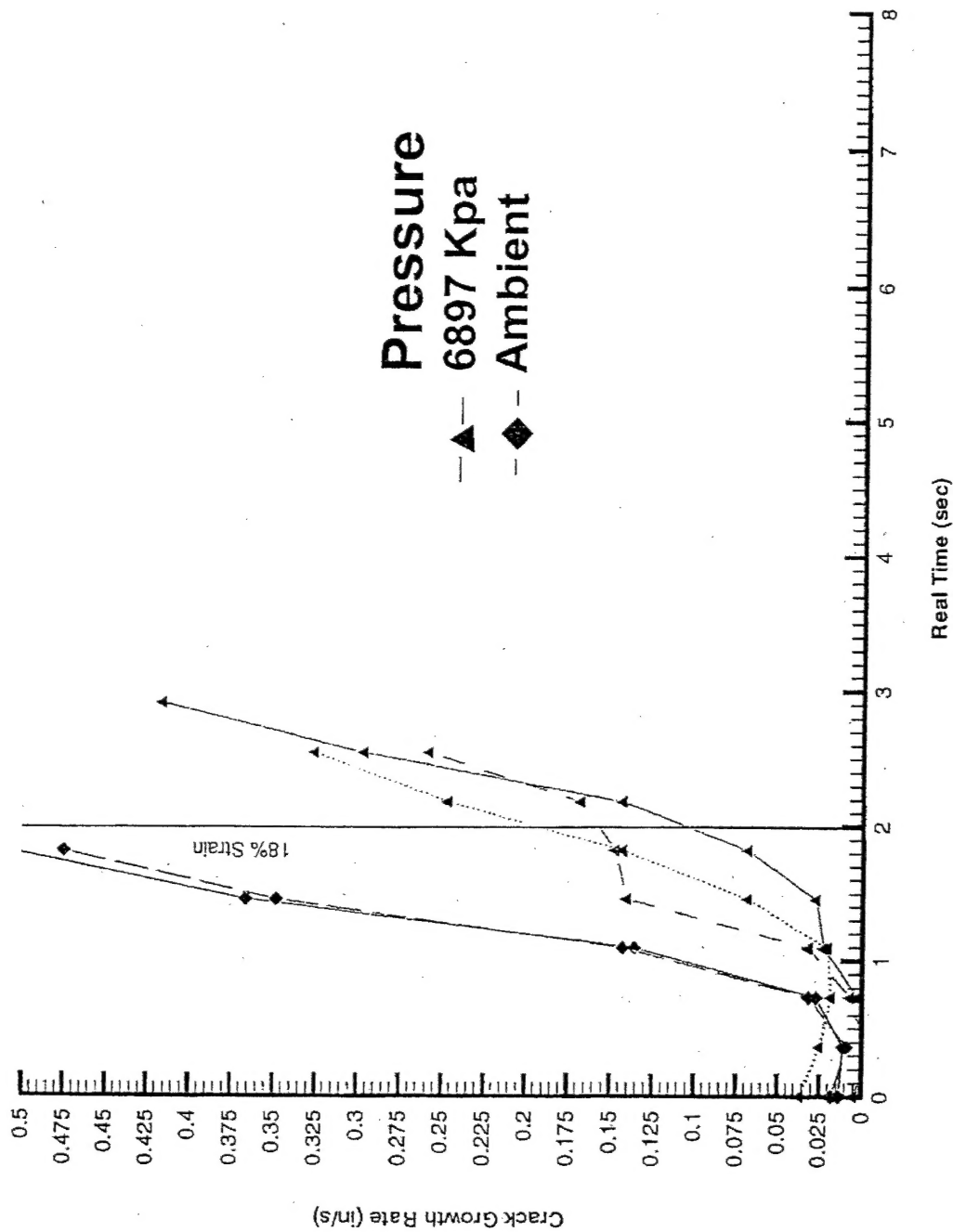
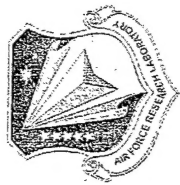
Half Crack Length Vs. Time (Constant Strain Rate Condition)

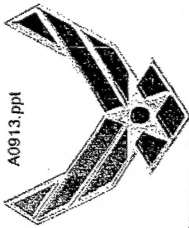




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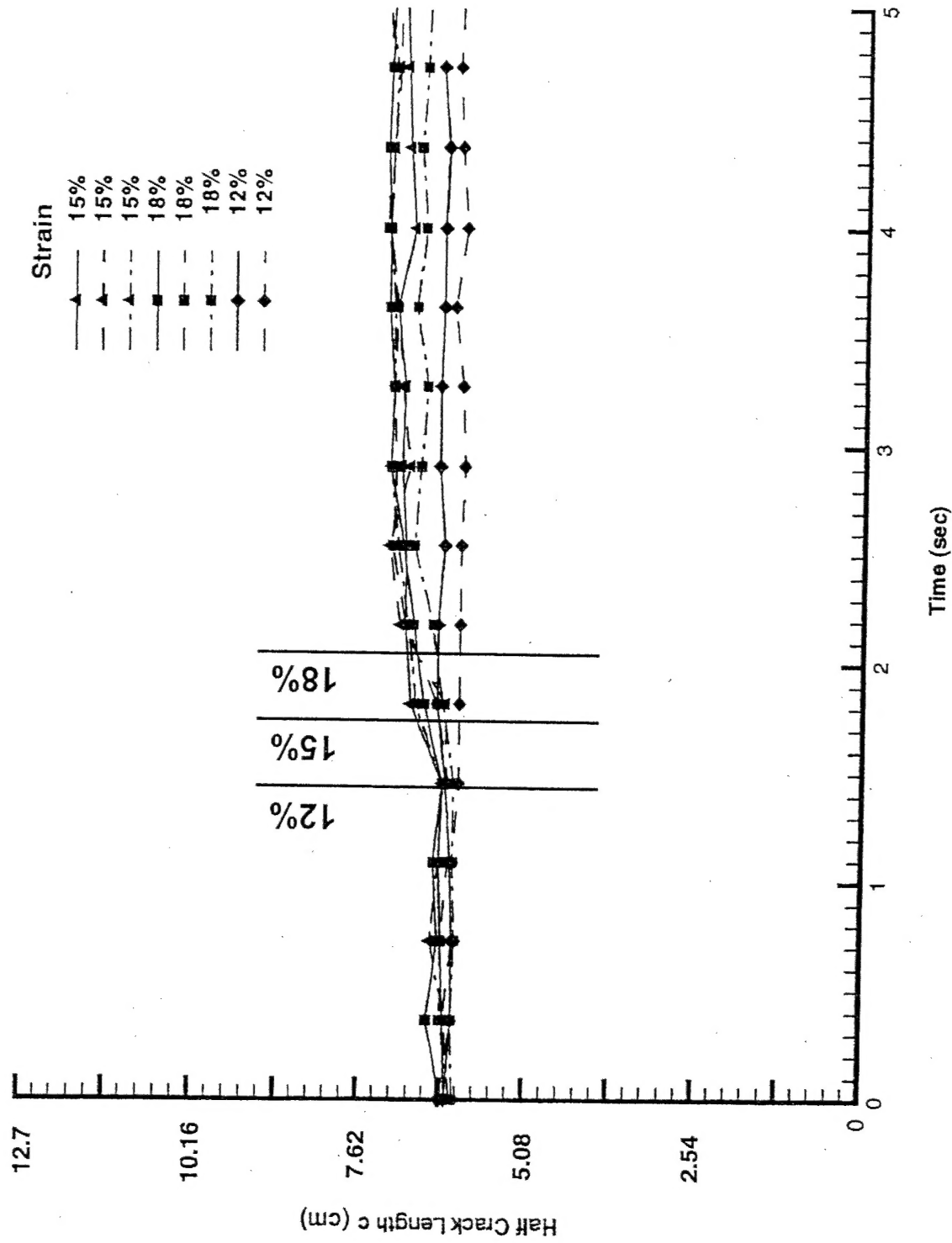
Crack Growth Rate Vs. Time (Constant Strain Rate Condition)

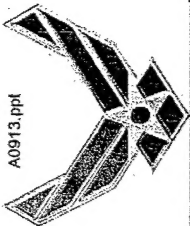




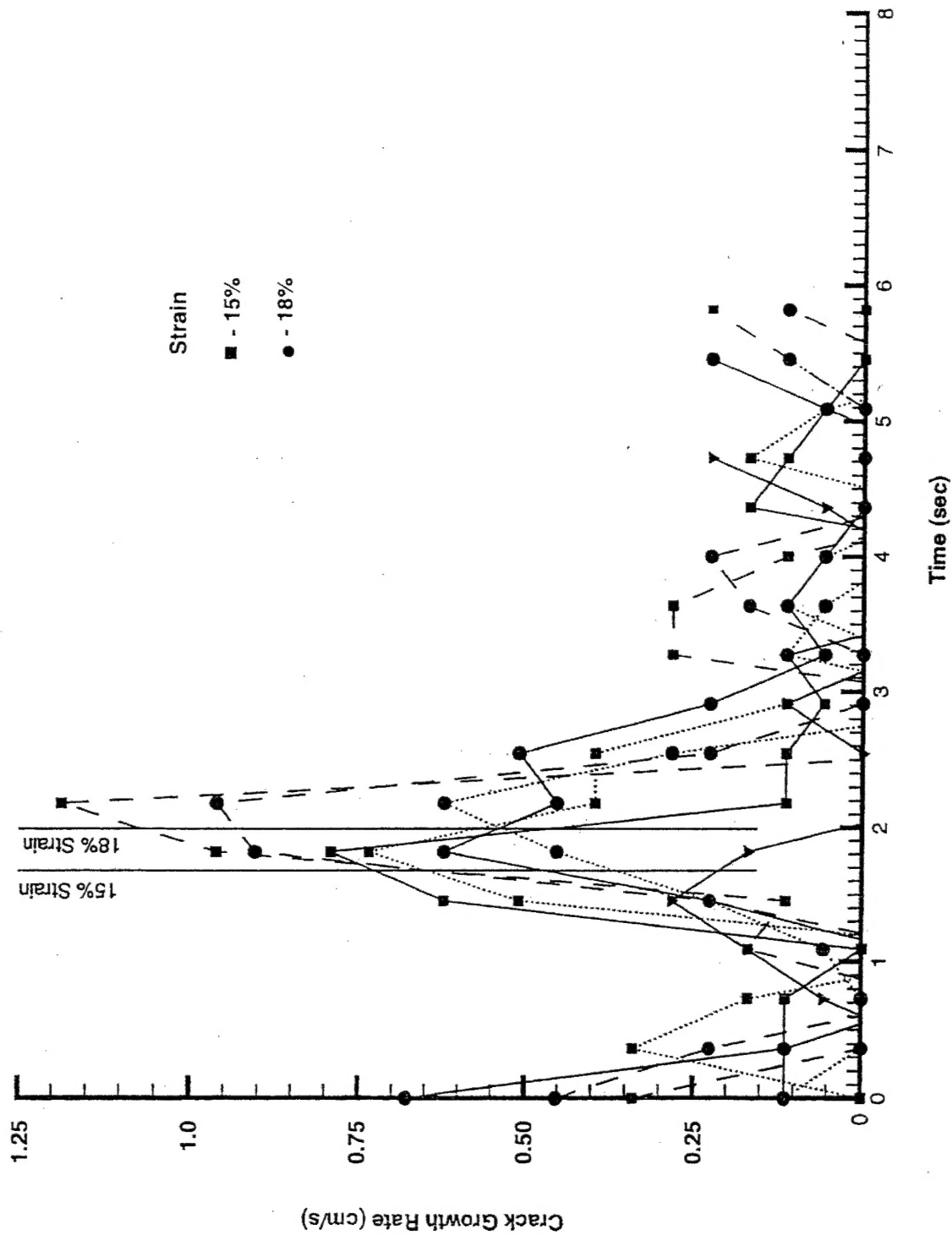
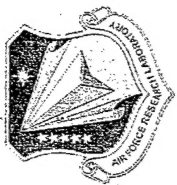
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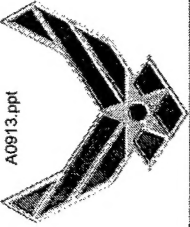
Half Crack Length c Vs. Time





Crack Growth Rate Vs. Time





Conclusions



- Under constant strain rate condition, the crack growth rate under ambient pressure is significantly higher than that under 6897 Kpa confining pressure.
- Under constant strain condition, in general, the crack growth rate decreases as the applied strain level is decreased.
- Under constant strain condition, the crack stops growth after it propagates a short distance.
- At the onset of crack growth, confining pressure has no significant effect on the size of the high strain region.